

TEXT OF THE FIRST OFFICE ACTION

The application number: 200480020250.6

As stated in the description, the present application relates to a self-aligning roller bearing. After examination, the opinions are provided. The present application cites the following reference documents:

reference D1: JP 4-39414A

reference D2: JP 2000-179559 A

reference D3: JP2002-339989A

reference D4: JP 1-220720A

1. Claim 2 does not involve an inventive step prescribed in Article 22, paragraph 3 of the Patent Law of China.

The reference D1 discloses a self-aligning roller bearing 1 in which double row rollers 30 as rolling elements are arranged rollably between an inner ring 10 and an outer ring 20 in a circumferential direction, wherein a roughness of an outer ring raceway surface 22 formed on an inner peripheral surface of the outer ring 20 is made larger than a roughness of an inner ring raceway surface 12 formed on an outer peripheral surface of the inner ring 10 (refer to claim 4 and Fig. 1 in the reference D1). The difference between Claim 2 and the reference D1 is that Claim 2 discloses the ranges of the specific values of the roughness of the outer ring raceway surface, the roughness of the inner ring raceway surface and the roughness of the rolling contact surface of the rolling element. However, the distinctive feature is disclosed by the reference D2. The reference D2 discloses that the roughness of the inner ring raceway surface is $0.083\mu\text{m}$ lower than $0.15\mu\text{m}$, the roughness of the outer ring raceway surface is $0.107\mu\text{m}$ larger than $0.1\mu\text{m}$ and lower than $0.5\mu\text{m}$ and the roughness of the rolling contact surface of the rolling element is $0.049\mu\text{m}$ lower than $0.1\mu\text{m}$ (refer to paragraphs 0018-0022, the third embodiment in table 2 in the description). It serves the same function in the reference D2 as it serves in the present application for solving its technical problem, both are for improving the lifetime of the bearing via properly controlling the roughness of the inner ring, the outer ring and the rolling contact surface of the rolling element. That is to say, the reference D2 gives the inspiration of applying the above technical feature to the reference D1 for solving its technical problem. It can be seen that, it is obvious for those skilled in the art to obtain the technical solution seeking for protection in Claim 2 on the basis of the reference D1 combined with the reference D2. Thus, the technical solution seeking for protection in Claim 2 does not possess prominent substantive features and represent notable

progress and so does not involve an inventive step.

2. Dependent Claim 6 further defines Claim 2. The additional technical features of Claim 6 are as follows: (1) $R_{ao}/R_{ai} \geq 1.5$, wherein R_{ao} is a lower limit value of a roughness range on the outer ring raceway surface on a center line and R_{ai} is an upper limit value of a roughness range on the inner ring raceway surface on a center line; (2) a difference of a retained austenite content γ_R between the rolling elements and at least any one of the inner ring and the outer ring is set to 3% or more in volume ratio. The additional technical feature 1 is disclosed by the reference D2. The reference D2 discloses the roughness of the inner ring raceway surface is below $0.1 \mu m$ and the roughness of the outer ring raceway surface is above $0.2 \mu m$. That is to say, $R_{ao}/R_{ai} \geq 2$ (obviously, it is larger than 1.5,) (refer to paragraph [0005] of the description in the reference D2). The additional technical feature 2 is disclosed by the reference D3 as follows: a retained austenite content of the inner and the outer rings of the self-aligning roller bearing is set to 6-12% in volume and a retained austenite content of the rolling element is set to 4-10% in volume, such that when the former one is set to 12% in volume and the latter one is set to 4% in volume, a difference of a retained austenite content between any one of the inner and the outer rings and the rolling element is set to 3% or more in volume ratio (refer to paragraphs [0011]-[0015] of the description in the reference D3). Thus, when independent Claim 2 does not involve an inventive step prescribed in Article 22, paragraph 3 of the Patent Law of China, dependent Claim 6 does not involve an inventive step prescribed in Article 22, paragraph 3 of the Patent Law of China over the combinations of the reference D1, D2 and D3.

3. Dependent Claim 10 further defines independent Claim 2. The additional technical feature of Claim 10 is that the outer ring raceway surface has machining traces that intersect with each other and the machining traces are formed by a super finishing, which is disclosed by the reference D4. The reference D4 discloses that the machining traces which intersect with each other are formed on the inner ring raceway surface, the outer ring raceway surface and the rolling contact surface of the rolling element by a super finishing (refer to the embodiments of the description and Figs. 1-6 of the reference D4). Thus, when independent Claim 2 does not involve an inventive step, dependent Claim 10 does not involve an inventive step prescribed in Article 22, paragraph 3 of the Patent Law of China over the combinations of the reference D1, D2 and D4.

4. When independent Claim 2 and its dependent Claims 6, 10 are not tenable, the

interrelated technical features between independent Claim 1 and Claim 3 i.e. "a self-aligning roller in which double row roller as rolling elements are arranged rollably between an inner ring and an outer ring in a circumferential direction, wherein a roughness of an outer ring raceway surface formed on an inner peripheral surface of the outer ring is made larger than a roughness of an inner ring raceway surface formed on an outer peripheral surface of the inner ring" are not the technical features contributed to the prior art and so do not belong to a specific technical features. Thus, independent Claims 1, 3 neither have the same or corresponding specific technical features nor belong to a single general inventive concept, which does not comply with the provision of Article 31, paragraph 1 of the Patent Law of China. When abandoning independent Claim 2, the applicant can delete one independent claim and retain the other independent claim so as to overcome the defect of lacking the unity or make amendments to the independent claims so as to overcome the defect of lacking the unity. As for the deleted one, the applicant can file a divisional application according to the relevant provisions.

Based on the above reason, the application can not be granted the right of patent under the present text. The applicant shall explain each of problems pointed out in the present office action and remove the defects of the inventiveness and the unity. It should be noted that any amendments should not go beyond the scope of the initial description and claims so as to comply with the provision of Article 33 of the Patent Law of China.

The amended documents to be submitted shall include: 1. a duplicate of the original text involving the amended part, on which any insertion, deletion and alternation should be indicated; 2. the re-typed replacement sheet after amendments (in duplicate), for replacing the corresponding original text. The applicant should ensure the consistency of the two parts abovementioned.

Examiner: Chen Haiying
Code: 2273